

REMARKS

Applicants submit this Amendment Under 37 CFR 1.114 in support of the request for continued examination (RCE) filed concurrently herewith, and in response to the outstanding advisory action dated May 9, 2008 ("May 9 AA"). The May 9 AA responds to applicants' Amendment After Final Under 37 C.F.R. §1.116 ("After Final Amendment"), submitted on April 14, 2008, in response to the final Office Action dated February 14, 2008 ("final OA"). Applicants amend claims 1 and 13 hereby. Claims 1, 3, 5-8, 10-13 and 15-20 are pending hereinafter, where claims 1 and 13 are the independent claims.

Drawing Objections

Applicants After Final Amendment responded to the objections to the drawings under 37 C.F.R. §1.83(a), as set forth in the final OA. Applicants cancelled claim 9 and amended claim 3 in response to the final OA. In the May 9 AA, the Examiner indicates that the amendment to claim 3 did not overcome the objection to the drawings.

In the After Final Amendment, applicants amended claim 3 as follows:

A floating point execution unit according to Claim 1, wherein:

the aligner computes ~~includes means to compute~~ a shift amount for aligning said product and the third operand; and

the multiplexer operates to select the third operand as the aligner computes ~~in parallel with the means to compute~~ the shift amount.

Applicants' Fig. 7 shows the aligner and multiplexer, which is understood by applicant to support the invention set forth in claim 3. Claim 3 recites a floating point execution unit according to Claim 1 (for which the drawing figures are not objected to), further limited by,

“wherein the aligner computes a shift amount for aligning said product and the third operand and the multiplexer operates to select the third operand as the designer computes the shift amount.”

Because Fig. 7 depicts the claim 3 aligner and multiplexer, an explanation of the operation for which is set forth at page 12, paragraph [0078], applicants respectfully assert that the drawings comply with 37 C.F.R. §1.83(a), and request withdrawal of the drawing objections, as claimed.

Rejections Under 35 USC §101

In the May 9 AA, the Examiner responds to applicants’ arguments set forth in the After Final Amendment, asserting that both independent claims 1 and 13 are merely directed to an arrangement for performing a mathematical operation, such as multiplying/addition, and that the multiply/addition merely comprises a series of mental steps, as claimed.

In response, applicants have significantly amended claims 1 and 13. As amended, claim 1 recites:

A floating point execution unit for performing multiply/add operations on a floating point number comprising a plurality of operands taken from an instruction having a plurality of floating point number operand positions, wherein the performing does not implement operand formatting selection and unpacking, thereby increasing a speed at which the floating point number is output, the floating point unit comprising:

a multiplier for calculating a product of two of the operands;

an aligner directly coupled to the multiplier for aligning said product and a third of the operands in a first data path;

wherein the [[a]]first data path is for supplying to the multiplier operands from a first and a second of the operand positions of the instruction;

a second data path for supplying the third operand to the aligner; and

a multiplexer on the second data path for selecting, for use by the aligner, either the operand from the second operand position of the instruction or the operand from the third operand position of the instruction, and supplying same to the multiplier;

wherein the first data path is maintained free of multiplexer operations, thereby increasing a speed at which the floating point number is output.

As amended, claim 13 recites:

A method of operating a floating point execution unit to perform multiply/add operations on a floating point number without implementing operand formatting selection and unpacking thereby increasing a speed at which the floating point execution unit operates, the floating point

unit having a multiplier, an aligner directly coupled to the multiplier in a first data path, and a multiplexer, the method comprising the steps:

sending an instruction to the floating point unit, including a floating point number upon which multiply/add operations are to be performed, the instruction having a plurality of operand positions holding operands of the floating point number;

using the multiplier to calculate a product of two of the operands of the instruction;

using the aligner to align said product and a third of the operands of the instruction;

supplying over the [[a]] first data path to the multiplier operands from a first and a second of the operand positions of the instruction, wherein said first data path is free of multiplexer operations;

supplying over a second data path a third operand of the instruction to the aligner;

positioning the multiplexer on the second data path;

using the multiplexer to select, for use by the aligner, either the operand from the second

operand position or the operand from the third operand position; and

outputting the selected operands to the aligner; and

outputting the floating point number upon which the multiply/add operations were performed;

wherein the first data path is maintained free of multiplexer operations, thereby increasing a speed at which the floating point number is output.

Hence, while the Examiner states that claims 1 and 13, after amendment by the After Final Amendment, do not explicitly define hardware components for performing the mathematical operation, applicants respectfully assert that after amendment hereby, amended independent claims 1 and 13 provide a useful, tangible, concrete result (MPEP 2106). Claims 1 and 13 do not claim a mere principle, but a novel floating point unit, and a novel method of operating a floating point unit, which process a floating point number and output the processing result. The claims are statutory under 35 USC §101. Claims 3, 5, 6, 7, 8, 10, 11 and 12 depend from claim 1 and are patentable therewith. Claims 15 and 17-20 depend from claim 13 and are patentable therewith. As such, applicants respectfully assert that the rejection of claims 1, 3, 5-8, 10-13 and 15-20 under section 101 are hereby obviated.

Rejections Under 35 USC 102(b)

In response to applicants' arguments in response to the rejection of claims 1-5 and 11-17 under 35 USC §102(b) in view of Elliot, in the After Final Amendment, the Examiner asserts that applicants' claim language (as per the After Final Amendment) does not require the multiplier directly coupled to the multiplier, or set forth how the aligner is directly coupled to the multiplier. The Examiner further asserts that Elliot at Fig. 2B shows a second path with a second

aligner, and that the second aligner couples directly to the multiplier in Fig. 2B.

In response, applicant has amended independent claims 1 and 13, as shown above. In pertinent part, both claims now include the limitation that the aligner is directly coupled to the multiplier in a first data path. The claims as amended make clear that there is direct coupling in a first data path, distinguishing Elliott's operation as asserted by the Examiner in (1) and (2) fourth paragraph of the May 9 AA. In pertinent part, the claims read:

the floating point unit having a multiplier, an aligner directly coupled to the multiplier in a first data path, and a multiplexer, the method comprising the steps:

sending an instruction to the floating point unit, including a floating point number upon which multiply/add operations are to be performed, ...

outputting the floating point number upon which the multiply/add operations were performed;

wherein the first data path is maintained free of multiplexer operations, thereby increasing a speed at which the floating point number is output.

Applicants respectfully assert that the instant amendments to independent claims 1 and 13 are fully responsive to the Examiner's arguments at the last paragraphs of the continuation of part 11 of the May 9 AA., and for at least these reasons, and the reasons set forth in the After Final Amendment, Elliot does not disclose each of the elements of amended independent claims 1 and 13, and that these claims are patentable under Section 102(b) in view of Elliott. Claims 3, 5 and 11-12 depend from claim 1 and are patentable therewith, and claims 15 and 17 depend from claim 13 and are patentable therewith. Hence, applicants respectfully

request withdrawal of the rejection of claims 1, 3, 5 and 11-13 and 15-17 under section 102(b) in view of Elliott.

Rejections Under 35 USC §103(a)

Applicants reassert their arguments for the patentability of dependent claims 6-8 and 18-19 under 36 USC §103(a) over Elliott in view of Willson, which were asserted in the After Final Amendment, which arguments are believed to be stronger in view of the instant amendments to claim 1 and 13 herein.

As mentioned above in response to the Examiner's statements in the May 9 AA, Elliott does not teach each of the limitations, or the equivalents, of applicants' independent claims 1 and 13 (as amended). Because Elliott does not include each of the limitations of amended independent claims 1 and 13, combining Elliott with Willson does not remedy the shortcomings of Elliott alone (under section 102). Hence, even assuming arguendo that Willson includes the limitations as asserted in the final OA, combining Willson with Elliott still cannot realize the floating point execution units and methods as set forth in claims 6-8 and 18-19, at least for the reasons set forth above, and set forth in the After Final Amendment for the patentability of amended independent claims 1 and 13 in view of Elliott under Section 102(b). Applicants respectfully assert, therefore, that claims 6-8 and 18-19 are not unpatentable under section 103(a) over Elliott in view of Willson be withdrawn.

Conclusion

Applicants respectfully assert that pending claims 1, 3, 5-8 and 10-13, 15-20 are statutory under section 101, are patentably distinct from Elliott under Section 102(b), and are patentably distinct from Elliot combined with Willson under Section 103(a). If the Examiner believes that a telephone conference with applicants' attorneys would be advantageous to the disposition of this case, the Examiner is asked to telephone the undersigned.

Respectfully submitted,



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